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APRIL 23, 1949

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



How Bright?

See page 260

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TECHNOLOGY DEPT



OLD ROMAN SETTLEMENT—This massive masonry is part of the remains of the Capitolium of Cosa. Rising in the background are the outer walls of the once enclosed part of a temple. On the left is a converted anti-aircraft barracks that serves as work and storerooms for the archaeologists.

MEDICINE

Noses and Ears to Order

► NOSES and ears by mail order are the latest aid to patients who have lost an ear or nose through injury or disease.

The mail-order ears and noses are replacements for artificial ones that have deteriorated or lost their lifelike coloring. They are possible through a permanent mold method devised by Dr. Arthur H. Bulbulian of the Mayo Clinic in Rochester, Minn. He has been constructing artificial noses and ears, medically known as prostheses, since 1936, and has made them for nearly 200 patients.

Lack of an ideal artificial skin material for these devices is the chief technical handicap yet to be overcome, he reports. Plastics of a pliable type and prevulcanized latex are the two types of material he is now using. They can be made to look very lifelike but have the disadvantage of deteriorating and losing their lifelike coloring in time, often after a few months' use.

To overcome this, he devised the permanent mold method by which the devices can be duplicated quickly, accurately and economically. Every patient for whom he makes an artificial nose or ear has a permanent metal or dental stone mold made and kept on file with the technical information needed to make an exact duplicate of the first prosthesis he got. The patient can send for a new one without having to go to the clinic for it.

Artificial noses are needed chiefly by patients who had to have most of their own noses removed because of cancer. Ears are replaced for patients who lost theirs through accidental injury or who were born with malformed ears. The tags of malformed or injured ears are removed by surgery and then the artificial ones are made.

Some patients can have skin and tissue taken from their own bodies to have damaged ears or noses reconstructed through plastic surgery. But patients with poor general health, with skin devitalized by X-ray treatment for a cancer, old patients and those who have to wait for plastic surgery until the doctor is sure the cancer will not come back need the prosthetic replacements.

Nose replacements are more important than ear replacements, Dr. Bulbulian points out in a report in the PROCEEDINGS OF THE STAFF MEETINGS OF THE MAYO CLINIC. Women seldom need artificial ears because they can cover the site of the ear deformity with their hair. Men need them depending on 1. whether the remaining ear sticks out or lies flat to the head, 2. whether or not his public appearance demands it (Dr. Bulbulian reports one made for a minister, for example), and 3. whether they wear eyeglasses which need a place for the bow to rest.

Science News Letter, April 23, 1949

ARCHAEOLOGY

U. S. Scientists Explore Ruins of Old Roman Town

► AMERICAN Air Force reconnaissance photographs taken during the war have proved exceedingly helpful to American scientists exploring the ruins of an Italian town that died and was deserted by its people 2,000 years ago. The story of this place, a hill town named Cosa in Etruria, was told by Prof. Frank E. Brown of the American Academy in Rome, in the journal *ARCHAEOLOGY* (Spring) published in New York.

Cosa was not a large town; its present ruins cover an area of only a little more than 33 acres. But it had all the features of a complete Roman city: walls, gates, streets, a forum, temples, public buildings, private houses. Roman life followed the same pattern there that it did in the larger frame of the capital itself.

The town existed as a Roman settlement from 273 B. C. Before that, however, there was a town on the same site that belonged to the pre-Roman civilization known as Etruscan. It was abandoned by its population some time during the first century B. C.

In addition to the air photographs, the American exploring party has had a ground survey made, with markers set in concrete to guide the digging that will get under way during the coming season. This was by no means the first concrete poured in Cosa, however: preliminary explorations showed that the Romans had used their own type of concrete in buildings put up as long ago as the second century B. C.

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CHEMISTRY

TCA, New Weed-Killer, Is Effective Against Grasses

► TCA joins 2,4-D in man's war against weeds. This new killing compound, which spells out in full as Tri-Chloro-Acetic acid, is recommended for use against certain weed grasses, such as quack-grass and Johnson grass, as well as against prickly-pear cactus.

Its value for this purpose was discovered by Du Pont research biologists at their pest control research laboratories. Subsequently, tests were made at the Kansas State Agricultural Experiment Station by J. W. Zahnley, station agronomist, and G. L. McCall, a Du Pont Company biologist.

TCA is recommended especially for use on grass and cactus patches that have resisted other means of eradication. It creates a kind of temporary desert, where nothing at all will grow for from one to three months. For this reason it is distinctly not recommended for use on lawns or golf courses. The temporary soil sterility which it creates, however, passes off after a longer or shorter time, depending on the rainfall.

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MEDICINE

Blood Test for Cancer

It is based on a disturbance of albumin in the cancer patient's body which gives a peculiar clotting capacity to the blood serum.

► A GREAT "break" in the fight against cancer has come. Soon, not too many months hence you and the ones you love will be able to have periodic cancer detection blood tests. Doctors should be able to spot cancer in very early stages, just as the X-ray photograph picks up beginning tuberculosis and sugar in the urine warns that diabetes needs control.

The Huggins cancer detection method, just made known, gives promise of becoming a screening method to spot the early cancer cases.

Cancer has not been chemically cured, yet. The disarrangement of protein used in the Huggins cancer detection may be a very "hot" clue to cancer cause. But it is too early to be sure or even too cruelly hopeful.

The importance of the new prospect of cancer detection is:

Discover cancer early and something can be done about it, even now. X-ray and radium can be used to kill the wild, malignant cells that unchecked would bring sure death to the person. The surgeon's knife can extirpate cancerous growth. The figures show that nearly seven out of every 10 cancer cases can be cured, in the sense of living five years after the operation, if they are discovered early.

Your doctor can't give this test today or tomorrow. It will take months before it is perfected, completely verified and made available at hospitals and clinics of the nation. Be patient as you are alert to use medical knowledge now available. And don't get worried just because you are reading about cancer.

When the Huggins blood test for cancer is applied it probably will be something like this:

A few teaspoons of blood will be taken from a vein in your arm, a safe, not unpleasant procedure that is routine in doctors' offices today. (Millions have given their pints of blood to the Red Cross blood program, remember.)

Technicians will separate the fluid serum from the blood. They will heat it to a certain temperature, add a chemical called iodoacetic acid, and compare the rate at which the serum clots under this treatment with the clotting of normal blood under the same treatment. There is a numerical index for this which shows whether the blood comes from a cancer patient or from a person free from cancer.

The test is "not quite as good as the Wassermann test" for syphilis, according to

Dr. Charles Huggins, University of Chicago scientist who developed it.

The new test has been made on almost

ASTRONOMY

Meteors' Flight Recorded

► THE flight of meteors across the sky is being recorded in a number of ways by Canadian scientists.

"Shooting stars" are hunted visually by a team of trained amateurs and professionals. The images meteors make on the radar screen as they race by are recorded automatically on photographic film.

Near Ottawa each clear night during a well-known meteor shower an enthusiastic group of some half-dozen sky-watchers scan the heavens for "falling stars." Whenever the observers see a bit of light streak across the sky, they push a button to indicate on photographic film when the meteor was first visible. On the same film appears the meteor's radar echo.

By comprising the record of a meteor as

300 persons, divided equally between cancer patients, apparently healthy persons and patients with diseases other than cancer. The test proved positive for all cancer patients, negative for all normal persons and negative for all other patients except those with lung tuberculosis and massive acute infections. But your doctor will be able to rule out these conditions by other tests.

The test was negative in pregnancy and even on the blood of embryos of unborn

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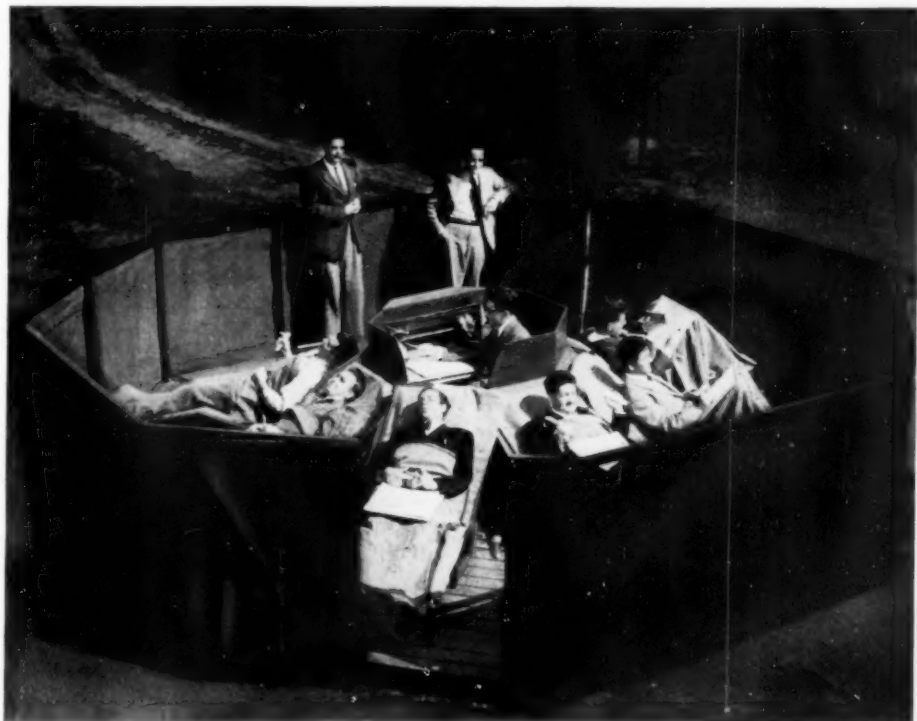
made by several methods, astronomers are learning whether they first appear by radar or visually, how their radar echo compares in length with the time they can actually be seen, and so on.

Most of the meteor echoes, these studies show, are produced in a fairly narrow region, about 10 miles thick, some 60 miles above the earth's surface.

Radar echoes tend to appear on the radar scope just as the meteor is disappearing from sight visually. At least this seems to be true for those of the Perseid meteor shower.

These radar sets are operated by the National Research Council and the program is in charge of Dr. D. W. R. McKinley. Dr. Peter M. Millman of the Dominion Observatory organizes the observations.

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SKY WATCHERS—About six miles south of Ottawa, Canada, amateur and professional astronomers "lie down on the job" of watching for meteors.

MEDICINE

Antibiotic from Bananas

► BANANA skins, which have been called nature's germ-proof wrapper, may owe their power of stopping germ penetration to an anti-germ chemical like penicillin and streptomycin. And a banana antibiotic may prove active against fungus infections as well as against germs of the bacteria class.

Preliminary tests indicating this were reported by four U. S. Department of Agriculture researchers, W. E. Scott, Hazel H. McKay, P. S. Schaffer and Thomas D. Fontaine, at the symposium on antibiotics held in Washington under the auspices of the U. S. National Institutes of Health.

Antibiotic substances from sweet potatoes were also announced by a team of Agriculture researchers headed by B. H. Bruckner and including all but Mr. Scott of the banana investigators.

Bananas apparently produce two antibiotics. One, active against fungi, including

specifically the fungus causing wilt disease of tomato plants, has been obtained from the pulp and skin of both green and ripe bananas. The other, apparently formed during the ripening process, is active against bacteria and is found in the pulp and skin of ripe bananas only.

The sweet potato plant also produces two antibiotics, one of which has activity against fungi. Among the bacteria against which it was tested is a non-disease-producing relative of the tuberculosis germ, called *Mycobacterium phlei*. The sweet potato antibiotic seems not only to stop this germ's growth but actually to kill it.

Work on both banana and sweet potato anti-germ chemicals is in very preliminary stages. Whether any of them will become useful medicines depends on tests still to be made.

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Blood Test for Cancer

(Continued from page 259)

babies. The fast growth in these conditions has given reactions similar to cancer in other attempted blood tests for the disease.

It will take only a few minutes of your time and only about 20 cents of your money for the test itself. Of course, if your doctor is doing it he will be giving you a general examination at the same time, to see whether you have any other ailments, and you will be paying him his regular fee for this service. The cheapness of the test itself and the fact that a technician can run 20 of them in a day are among the factors that make it suitable for mass screening at cancer detection centers.

The test is based on a disturbance in the way the body handles protein. What causes the cancer is still to be determined, but Dr.

Huggins thinks scientists can get ahead much faster now on finding the basic cause of cancer. When that is done, methods of prevention and better treatments may follow.

Researches by many scientists, going back to 1932, on proteins in the blood serum of cancer patients, gave important clues and background knowledge which led Dr. Huggins and his colleagues to the test just announced.

Dr. Huggins is already famous for his discovery of a sex hormone method for controlling prostate gland cancer. He reported his latest discovery to the American Cancer Society on the eve of his departure to deliver the presidential address before the meeting of the American Association for Cancer Research in Detroit.

His research was supported last year by an American Cancer Society grant of almost \$75,000 and will be further sup-

ported by another \$89,600 grant this coming year.

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On This Week's Cover

► THE amount of light produced by tiny radio dial bulbs is determined and recorded in a spherical chamber, developed by Westinghouse, some 200,000 times larger in volume than the bulb. When the bulb is placed, the sphere is closed. Its white insides is a perfect diffusing surface at any point where the light strikes.

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MEDICINE

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PHYSICS

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MEDICINE

Hypertensive Personality

High blood pressure people are mild and retiring, contrary to popular opinion. Low salt diet believed only effective in the mild form of the disease.

► CONTRARY to popular impression, the high blood pressure personality is not the explosive, desk-pounding type. Instead, it is the kind seen in a rather retiring, mild person who goes back three times to make sure he has turned out the lights or locked the door.

This picture of the high blood pressure personality emerged from a comparison study reported by Dr. Henry A. Schroeder of Washington University School of Medicine at the meeting of the American Foundation for High Blood Pressure in Cleveland.

In technical terms, Dr. Schroeder said the high blood pressure patients showed "subnormal assertiveness" and "obsessive-compulsive" traits when the personality patterns of 50 of them were compared with 50 psychoneurotic patients and 48 patients suffering other chronic diseases. He suggests the two traits may be important in the makeup of patients with high blood pressure.

The present widespread treatment with a low salt diet was found effective only in patients with the milder form of hypertension, a group of research specialists agreed.

Patients given a low salt and low protein diet for 90 days showed no significant change in their blood pressure level, according to Drs. William Goldring, Herbert Chasis, and Homer Smith, of the New York University College of Medicine. This diet, however, impaired their kidney function.

In another group of 25 patients on a low salt diet, less than one-third showed a significant response, reported Dr. Schroeder. The response was best in those who suffered with the less severe form of the disease, he stated.

Several drugs which will lower blood pressure are showing promise.

Tetraethylammonium chloride has been found of great value in diagnosing and determining the severity of high blood pressure in pregnancy. The disease is responsible for convulsions, which is becoming one of the greatest killers of women and unborn children, a research team of the University of Cincinnati—Drs. Eugene B. Ferris, A. Brust, and N. S. Assali—found.

Veratrum viride, which comes from the root of a North American plant, has proved highly effective in some patients, reducing the size of enlarged hearts and bringing heart function more nearly to normal, Dr. Robert W. Wilkins and his co-workers at the Massachusetts Memorial Hospitals discovered. Only between 10% and 20% of

the patients with high blood pressure fail to respond to this treatment, they pointed out.

Dihydroergocornine, a derivative of ergot, drug long used to check hemorrhage in childbirth, has lowered blood pressure for from eight hours to several days without producing serious toxic effects, Dr. Wilkins reported.

Prisol, a drug which dilates the small arteries, has shown encouraging results in patients not able to undergo surgery, Dr. Keith Grimson of Duke University Medical School disclosed.

Heparin, an anti-blood clotting drug found 20 years ago in liver extracts, is aiding in relieving the symptoms of eclampsia, convulsions brought on by high blood pressure in pregnant women. Dr. E. W. Page of the University of California Medical School, and other medical investigators working with the drug, have noted that many serious symptoms showed improvement. But the improvements last only as long as heparin is given, the patient needs constant attention, and the drug is expensive and carries a possible danger, Dr. Page cautioned.

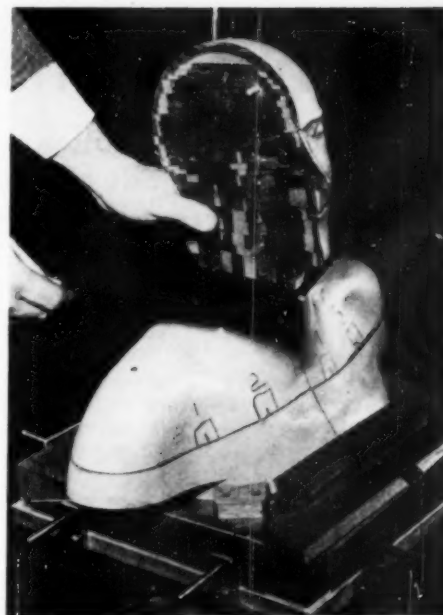
A new method of studying high blood pressure in rats has been developed by Dr. Meyer Friedman, director of the Harold Brunn Institute for Cardiovascular Research, and his associates. The group has devised a special microphone which is applied to the tail of a rat, picking up the contractions of the arterial pulsation of blood in a sound detectable to the ear.

The first successful attempt to determine the rate of disappearance of digitalis from the blood and the daily rate of its excretion in the urine has also been made by this research team. They made this study by means of embryonic duck hearts.

The output of blood by the heart can be measured by a simple method perfected by Dr. W. F. Hamilton of the University of Georgia. A known amount of dye is injected into a vein and then samples are collected of blood from the arteries. The more dilute the dye in the arterial sample, the greater the blood flow. This information is important to the physician because the height of blood pressure is partly determined by the amount of blood the heart must process.

The Foundation recently announced \$78,000 in grants to hospitals, clinics, medical colleges and laboratories doing intensive research on high blood pressure and hardening of the arteries.

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RADIATION "GUINEA PIG"—
This wooden man is made up of layers of wood and other porous materials. Film to record X-ray penetration is being inserted in preparation for a radiation test.

PHYSICS

Wooden Man Is Stand-In In Big Dose X-Ray Studies

► LATEST thing in the way of "guinea pigs" for medical investigations is a wooden man known around the laboratories of Massachusetts Institute of Technology as "Mr. Cruikshank."

He is used as a stand-in for studies of the effects of super-voltage X-rays produced by nuclear science machines such as Van de Graaff accelerators. He is the brain-child of Dr. John G. Trump, associate professor of electrical engineering, and Dr. J. Eugene Nelson of M. I. T.

This head and shoulders replica of a human head and neck is made of layers of wood and other porous materials. These are built up so as to reproduce as nearly as possible the densities of the bones, skin and other tissues of the human head.

Cruikshank's head is sliced along several cross sections so that films and other recording devices can be slipped in when needed. After he has had a dose of X-rays that doctors might contemplate using for cancer treatment, the films and other devices in his head tell how much radiation has reached their locations. This gives information on how far the X-ray dose would penetrate human tissue and thus whether it would be effective or dangerous.

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EDUCATION

Science Joins Three R's

Scientific education should be aimed at teaching the facts and methods of science and developing scientific talent, school report indicates.

► YOUNGSTERS in the lower grades of school are now learning science almost as soon as they get the famed reading, 'riting and 'rithmetic.

Elementary science is becoming a part of such courses as reading, spelling, history and arithmetic, a report of the National Education Association declared. Dr. Willard E. Givens, executive secretary of the Association, explained that, "Science cuts across our school studies as it cuts across our lives."

In addition to such scientific studies as geography and health, today's grade school students now find science in their other courses. In earlier grades, scientific methods enter into the process of learning to think, the report points out.

Basic to all education, the report finds, are the old, familiar three "R's."

Today's American schools "are teaching them better than they have ever been taught before," and the time spent on these studies in the schools is four times that of a century ago, Dr. Givens says.

Other jobs for schools, pointed up in the report, include:

International understanding, through study of the languages and cultural achievements of other peoples. "Effective study by many people in the United States of the languages of other peoples in the world is a necessary part of world understanding."

Effective citizenship in a democracy by the study of the social studies—history, civics, economics, sociology and geography.

Health, safety and conservation by study and training in the school.

Education as well as training in vocational education.

Moral and spiritual values encouraged in school life, "an important segment" of life itself.

Opportunities in music and visual arts for "the large percentage of American boys and girls who are not getting them."

Science and Mathematics

The annual report of the National Education Association in an article entitled "Science and Mathematics", states:

Victory in World War II owed much to scientific knowledge, technical ability, and inventive genius. The invincible machinery of this war forced the magic of science and its related arts upon the attention of millions who seldom had given them a thought before. However, for decades, science has increasingly conditioned every basic life need and every important life activity. The achievements of science and its associated skills are the distinguish-

ing characteristics of material progress in the Twentieth Century. Further development in these fields will determine the political, economic, and social patterns of tomorrow. In an address he made to the British Parliament in the midst of the war, Winston Churchill said, "The future of the world . . . is left to highly educated races who alone can handle the scientific apparatus necessary for preeminence in peace or survival in war."

The challenge to the individual is no less than it is to the race. No knowledge he can acquire is more vital to him. No career he may follow offers greater opportunity for personal attainment. Science and mathematics are among our most important school studies.

The citizen who never advances beyond the state of regarding science as a complication of gadgets and miracles will travel through life as a tourist in a strange country. The first general objective of science education is, therefore, understanding and appreciation not only of the facts, but also of the methods of science. This is an objective for all students.

There can be no greater loss than the waste of human talent. The future leaders of science are now in our schools. They must be found, inspired, and guided in undertaking the long and careful study without which even the most gifted cannot greatly achieve in one of the most intricate fields of human labor. A second general aim of science education is, therefore, the discovery and development of talent. This is an objective for a comparatively small number of students whose abilities range from technical skill to creative genius.

In recognition of these objectives, the schools are engaged in reorganizing the school studies that relate to science, and to mathematics which is indispensable to the full understanding and use of scientific facts, as well as to the discovery of many of them.

A program of elementary science is emerging in the early grades. It deals chiefly with understanding and appreciation of scientific facts and methods. It is designed to meet the needs of children, curious about natural phenomena and confronted by problems related to science in their daily lives. The subject matter of science is integrated with the other studies, such as reading, spelling, history, and arithmetic. Geography introduces the pupil to basic facts in astronomy and physics, geology and meteorology. The study of health begins with

elemental facts in biology, physiology, and chemistry. Science cuts across our school studies as it cuts across our lives.

Even in the earlier grades, students acquire some skill in the use of scientific methods. They collect evidence, and weigh it. They generalize on the basis of evidence. They formulate hypotheses and test them before arriving at a conclusion. This is the pattern of all reasoning. In this process, children learn how to think.

More formal studies in science and mathematics begin in the upper elementary grades where there is a greater degree of subject matter organization. General science and general mathematics are offered at the ninth-grade level in many schools.

The three years of the senior highschool offer biology, chemistry, and physics, usually in that order. Laboratory work is an essential part of these studies. Only about five percent of all high school students find time for the complete sequence. In mathematics, the traditional studies of algebra, geometry, intermediate algebra, and plane trigonometry are common to most schools. Only a few students elect more than two of these subjects. Continuance in the high-school of considerable practice in arithmetic skills is a trend worth noting.

In the senior highschool, science and mathematics teachers look forward to a "two-track" program, one of which will be followed by the students for whom high-school is the terminal point in formal education; the other of which will be traveled by those who are on the way to college and perhaps to life careers in the scientific occupations.

For the former, units of study will be drawn from plant and animal life, earth sciences, astronomy, machines, communications, and materials. Many of these can be taught most effectively as a part of world geography, industrial arts, vocational education, or even history and literature.

The smaller group of students will be enrolled in the specialized studies in science, practiced in all the scientific methods and disciplines of these studies, and started on the road to as great achievement as their talents and training lead them.

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INDUSTRIAL HYGIENE

Showerbaths Are Planned To Keep Air Clean

► SWIRLING showerbaths for dangerous factory exhausts and smokes will keep the atmosphere unpolluted, the American Industrial Hygiene Association was told in Detroit.

A new method of scrubbing gas or air with high pressure water fog can trap even air contaminants that won't dissolve in water, D. G. Hudson of East Lansing, Mich., told the experts. Installations show that it works on gases, vapors and fine particles, and it also dispels bad odors.

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PSYCHOLOGY

Modern Youths' Ideals

Fewer youngsters today want to emulate historical characters, turning their hero worship to figures in sports and movies, poll shows.

► NOT so many boys and girls today want to grow up to be like George Washington, Abraham Lincoln, Clara Barton and other historical figures, as did 50 years ago. The following of hero worshippers lost by historical persons of eminence has been absorbed by Babe Ruth, Gene Autry, Jack Benny and Betty Grable.

The modern trend in personal ideals was revealed by a study of over 1,500 children aged around 13 years who were in the seventh and eighth grades of Massachusetts public schools. Dr. Lawrence A. Averill, of State Teachers College, Worcester, Mass., who conducted the poll, compared his results with a similar study of 1,440 children of California and Minnesota that was conducted in May, 1898. Results were reported to the meeting of the Eastern Psychological Association in Springfield, Mass.

Fifty years ago, when their elders were "remembering the Maine," young boys and girls chose the individuals they wanted to emulate as follows: 78% from among the great people of history, 12% from notable characters in literature, and the remaining 10% from among friends and relatives, especially the father for boys.

Today, there are still one out of ten who want to grow up to be like Dad, or mother or an older brother or sister or friend. But there ends the similarity between the childhood ideals of 1898 and 1948. Less than half of the boys and girls today chose their heroes from any of the categories listed in 1898.

Literature has dropped completely from the picture as furnishing youthful ideals for emulation.

Historical characters still head the list, but their following has dropped from 78% in 1898 to just about one out of three today.

A total of 268 boys, 23% of all the children, want to be like some figure in sports. Among the boys, baseball accounted for 151 choices. Ted Williams, Boston batting hero, and the late Babe Ruth polled over half the baseball votes. Most glamorous character in the sports world for girls is the Canadian skater, Barbara Ann Scott, 1948 Olympic star.

Fourteen per cent choose their ideals from the movies or radio, radio being in the lead for boys, with Gene Autry and Jack Benny; the movies influencing the girls more, especially Betty Grable, Jane Powell, Shirley Temple and June Allyson.

Although the children were asked to name a person whom they wanted to be like 10 years from now, about one out of

five named instead an occupation. Most popular among the boys were airplane pilots, musicians, bankers, physicians, engineers, actors, tradesmen and writers or reporters. More than a third of the girls naming occupations wanted to be teachers or nurses. Next in order of popularity were columnists, musicians, writers and reporters, secretaries and stenographers, airplane hostesses and even roller-skaters.

AGRICULTURE

New Fiber Grown in Cuba

► KENAF fiber, a new crop in the Western Hemisphere now grown successfully in Cuba and El Salvador, seems specially suitable for sugar bags, coffee bags, cordage and burlap to replace the jute now imported largely from India.

Cuba has an ideal climate to produce kenaf, whose original home is India, and Cuba has a home market for the product. This sugar-producing island uses around \$20,000,000 worth of sugar bagging annually, and the kenaf season dovetails with the sugar season so that the same laborers can be utilized for both.

Kenaf is a fast-growing plant, distantly

Only 12 children out of the total 1,526 questioned, named a religious figure as an ideal. Four of these named Jesus Christ, two named Saint Joseph, two named a missionary, three a minister or priest and one named a nun. This shows a drop in interest in religious characters, as about 5% named the Deity in 1898.

In general, the movies and radio do not have as much allure for these children as might have been expected, Dr. Averill concludes.

About half as many boys want to be engineers as want to be Bob Hope. As many girls want to be secretaries and stenographers as to be June Allyson, and as many want to be nurses as want to be Jane Powell and Shirley Temple combined. Half as many of both sexes aspire to be teachers and nurses as want to be movie stars.

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related to cotton and okra. Botanically, it is *Hibiscus cannabinus*. Plants reach a height of eight to 12 feet in about 100 days, when it is ready to harvest.

The fiber is contained in the bark, as in jute. It can be extracted successfully both by mechanical means and by retting in stagnant water for a few days.

The fiber is obtained in strands nearly as long as the stalks. It is soft in texture, light straw in color, and about as strong as jute. About one ton of kenaf fiber can be obtained from an acre. In addition to fiber, this plant produces seed which yields oil.

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FIBER ON THE LINE—Part of a 100-acre commercial planting of kenaf fiber in Cuba hangs on racks for open-air drying in the sun.

BIOCHEMISTRY

"Regulator" Controls Life Of Male Reproductive Cell

► ARTIFICIAL insemination of cattle and other animals, already a highly important factor in the livestock industry, may presently be made even more economical and certain through discovery by three University of Wisconsin biochemists of a "regulatory" substance in male reproductive fluid.

This "regulator" compound, source and chemical structure of which are still unknown, has the effect of speeding up the life-processes within the swimming male reproductive cell, at the same time making it age more rapidly, and thus shortening its useful life. If some way can be found to render it inactive at the inseminator's option, the practical storage period for seminal fluid, at present inconveniently brief, may be greatly lengthened.

The three-man research team, who report their discovery in the journal, *SCIENCE* (April 8), are Drs. Henry A. Lardy, D. Ghosh and G. W. E. Plaut.

Science News Letter, April 23, 1949

WILDLIFE

Alaska Bears Dig Holes In Roads To Get Dinner

► BEARS and ground squirrels give motorists in Alaska a real headache—not to mention the risk of broken bones. This is how:

Most Alaska roads are of gravel. Ground squirrels burrow into them to make their dens, as they would into natural gravel banks. Bears, a-prowl for their dinners, enthusiastically dig after them. A hungry bear is perfectly willing to dig a hole as big as a barrel to get one ground squirrel.

If you want to know what that does to traffic, especially at night, just ask an Alaskan truck driver—provided you have asbestos ears.

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CHEMISTRY

Vinegar-Atom Group Helps In Making of Rubber

► RUBBER is made out of vinegar—or at least out of the chemical compound that is the essence of vinegar.

Steps in the formation of rubber in the guayule plant that grows in the American Southwest were traced by means of "tagged" radioactive atoms by Dr. James Bonner of the California Institute of Technology. Dr. Bonner described his experiments before the meeting of the American Chemical Society.

The chemical group that is the essence of vinegar is known technically as the acetate molecule. In the experiments, such molecules were "tagged" with radioactive

carbon atoms, then fed to guayule plants. Very soon the bits of rubber in their stems were found to be radioactive. Progressive steps in the buildup of rubber (and related gums) were described by Dr. Bonner as: acetate, acetone, betamethylcrotonic acid, rubber.

The techniques of tracing through a plant any given element or compound that has been radioactively tagged was described before the meeting by Dr. Melvin Calvin of the University of California. The radioactive material is supplied to the plant, to be absorbed through roots, leaves or otherwise. After a measured time interval the plant is suddenly killed, so that movement of any materials in its body is promptly stopped right where it is. Then parts may be removed for analysis or for detection of radioactivity with Geiger counters or photographic film.

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METEOROLOGY

Freezing Point Studied By Weather Scientists

► WEATHER scientists who have already made artificial rain and snow by spreading dry ice in supercooled clouds are conducting experiments at the General Electric laboratories in an effort to learn more about how and why materials freeze.

They have already "super-cooled" water 71 degrees below the ordinary freezing point without its turning into ice, and they have super-cooled mercury 72 degrees below its freezing point; tin, 198 degrees; and gallium, 125 degrees.

Scientists have long known that water can be cooled far below the ordinary freezing point and still remain a liquid. More than proper temperature and pressure are required for freezing. There must be particles present about which material freezes. These are the so-called nuclei. The General Electric scientists who made artificial snow by scattering dry ice particles from airplanes into supercooled clouds supplied the necessary nuclei in the tiny particles of the solid carbon dioxide.

Water below its freezing point is often found in nature, and a common place is in clouds of what are called the supercooled type. If no nuclei are present to cause freezing the water does not turn to ice. The result of putting nuclei into such clouds is the formation of water droplets and snow crystals.

General Electric scientists report that they have now made "clouds" of super-cooled gallium, tin and mercury. To do this they dispersed these metals in their liquid form as minute droplets suspended in oil. Some of the droplets may contain nuclei, but the freezing that begins in them cannot spread through the oil. Those without nuclei can be reduced in temperature far below their freezing point without solidifying.

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IN SCIENCE

BIOPHYSICS

Radiation Can Kill By Missing the Target

► ATOMIC "bullets" can make their "kills" by missing the target, which may be a bad or good living cell or germ.

This paradoxical behavior seems to have been demonstrated through bombardment of a bacteriophage with deuterons (heavy hydrogen particles) undertaken by Drs. Ernest C. Pollard and Frederick Forro, jr. of Yale University's biophysics division. The bacteriophage is on the borderline between living and non-living things and acts on one of the familiar coli germs.

Just how radiation, whether from an atomic bomb or lesser sources, acts on living material is of great importance, the scientists point out in their report to the journal, *SCIENCE* (April 15). The new theory suggests that the effect can be produced by secondary radiation from a path of the subatomic projectile that doesn't actually pass through the object affected.

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GEOLOGY

Interior Gases May Mingle With Earth's Fresh Air

► "HELL" sends its fumes constantly to mingle with the earth's fresh air, according to the latest geological theory advanced by W. W. Rubey of the U. S. Geological Survey, Washington.

The earth's hot and deep-seated interior is constantly supplying chemicals, carbon dioxide, water vapor and smelly hydrogen sulfide, to the atmosphere, Mr. Rubey contends.

Disagreeing with the two accepted theories concerning the gases in the atmosphere, he proposes that they escape at a constant rate through hot springs and steam vents.

One theory to account for the gases in the air holds that they have been present since the earth's formation, and that volcanic eruptions are merely a recirculation of the same material.

The other accepted theory is that gases are added to the atmosphere in large quantities at the time of volcanic eruptions, after which there is a lull when nothing is added except for minute quantities from hot springs.

Both of these theories fail to explain the continued existence of life and the presence of certain rock formations on this planet, Mr. Rubey believes. His explanation for the gases in the atmosphere is expected to cause some controversy among geologists.

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CE FIELDS

PHYSICS

New Betatron Will Be Used To Extend X-Ray Technique

► RESEARCH using X-ray technique will extend to far greater ranges in the future at the National Bureau of Standards with a new "atom-smasher" ready for immediate installation. It is a 50,000,000-volt betatron, which will raise the Bureau's top limit from its present machine which gives 1,400,000 volts.

The Bureau of Standards has long played a leading role in developing standards for X-ray dosage measurements and standards development. The betatron is one of the electron accelerators which produce extremely high energies and frequencies. They have wide applications in medical, biological, industrial and nuclear fields. The new machine will widen the Bureau's activities.

The 50,000,000-volt betatron to be installed is a product of General Electric, and is now ready for shipment. It will be housed in a special building with a main chamber covered with several feet of concrete and earth. Sensitive measuring equipment will be in an adjoining room.

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PHYSICS

Ultraviolet Microscope Takes Three-Color Photos

► AN ultraviolet microscope, which uses different wavebands of invisible light to take photographs that can be projected as three-color pictures within a few minutes after taking, has been developed in the research laboratory of the Polaroid Corporation in Cambridge, Mass. First description of the new instrument is given in SCIENCE (April 15) by E. H. Land, president of the corporation, together with seven associates who worked with him in perfecting it.

Chief advantage of the new microscope is that it can obtain marked contrast effects in the images of different kinds of cells and tissues without the use of the chemical stains employed in visible-light microscope studies and photography. These stains almost always cause changes in the material studied, and as a rule it is necessary to kill living tissue before it can be stained at all. With the new color-translating ultraviolet instrument the only possible element of change present is the ultraviolet radiation itself; and exposures to this are usually so brief that little or no ill effect follows.

A further advantage of the new instru-

ment is that the lens system works as well with visible light as it does with ultraviolet, so that it is possible to set up and focus on a preparation with ordinary light before the more difficult job of ultraviolet photomicrography begins.

Three successive photographs are taken, on 35-millimeter film, using a different waveband in the ultraviolet for each one. The film is then automatically fed into ultra-rapid developing and fixing baths, which are kept hot to speed their action.

The finished and dried three-color frames are ready for projection in a matter of minutes. This high-speed work is of great importance under some circumstances, as in the examination of tissues suspected of being cancerous.

Associated with Mr. Land in this work were E. R. Blout, D. S. Grey, M. S. Flower, H. Husek, R. C. Jones, C. H. Matz and D. P. Merrill.

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AERONAUTICS

Jets for Civil Transports Not Expected Until 1960

► DON'T expect jet-propelled airplanes for commercial transportation in the immediate future, the Society of Automotive Engineers was told in New York by R. C. Loomis, Consolidated Vultee Aircraft Corp., San Diego, Calif. It looks now, he said, as if jet-propelled commercial transports will go into general service about 1960, or perhaps even later.

Present indications are that airlines will use turbine-propellers before they install jet powerplants, he stated. Jet-propelled craft will eventually be used, because they carry the same load faster for the same fuel dollar. The next great step in air transportation will be the conversion of existing equipment to turbine-propellers which, being lighter and more efficient, will permit increased pay-loads and improved performance.

The turbine-propeller combination, called turbo-prop for short, is a gas turbine which drives conventional propellers. High pressure gases of combustion are directed against vanes on a shaft and cause rotation in the same way as is done in the familiar steam turbine engine. The rotating shaft operates the propellers.

Before true jet propulsion can be used in commercial transportation, there is much to be done. As explained by Mr. Loomis, there is no way to stop heavily-loaded jet planes on wet and icy runways, and there is no system of air traffic control adequate for their speed. Also, there is no capital in the air transportation business with which to finance them. He pointed out that it will be at least 1960 or 1965 before complete traffic control procedures and equipment for high-speed straight-in approaches to landing will be in operation.

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AERONAUTICS

Many New Airports Needed For Increasing Aviation

► THE United States needs 4,977 new or improved airports for present and immediate future air service, the U. S. Civil Aeronautics Administration declares in its NATIONAL AIRPORT PLAN for 1949. Of these 2,794 are for completely new landing fields.

Actually, it is a three-year forecast of aviation needs. This is the third in a series of annual reports prepared by CAA in accordance with an act of Congress. The estimated cost for the new ports and the improvement of others would cost \$1,115,300,000 of which \$510,600,000 would be in federal funds.

In the report, copies of which may be obtained from the CAA office of information in Washington, new and improvement proposals are listed by location and classification. Airports are divided into classes based on the longest usable landing strip. Class I airports have runways from 1,800 to 2,700 feet in length; Class IV, runways from 4,500 to 5,500 feet. Class IX are 9,500 feet or over.

The 1949 report lists a total of 567 Class IV and larger airports, of which 24 would be new; a total of 608 Class III ports with 165 new and 443 for development. It lists a total of 1,048 Class II airports, 474 being new; and 2,358 Class I flying fields, including 1,777 which do not now exist. It is to be noted that the plan proposes a large number of small airports, particularly for smaller towns and the benefit of private fliers as well as for light commercial planes.

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WILDLIFE

Deers' Teeth Tell Age, Just Like Horses'

► DEER can now have their ages read by their teeth, just as horses can. A detailed series of descriptions and charts of both front teeth and molars of the white-tailed or Virginia deer, worked out by C. W. Severinghaus of the New York State Conservation Department, appeared in the JOURNAL OF WILDLIFE MANAGEMENT (April).

Mr. Severinghaus' method is based on the height of the teeth above the gumline and the amount of wear on their crowns, at all ages from newborn fawns to ten-year-old specimens. His studies were made on living animals, which as a rule had to be put to sleep temporarily with an anesthetic so that they would not kick and struggle while he pried open their jaws and made examinations and measurements with the aid of a dental mirror.

Studies were also made on the jaws of deer that had been killed. In all cases, only specimens whose ages were actually and demonstrably known were used.

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ASTRONOMY

Mercury Appears Briefly

This planet, which is nearest the sun, will be seen at dusk around May 10. A brighter planet, Venus, will become visible the middle of the month.

By JAMES STOKLEY

► OF ALL the nine major planets, Mercury is nearest the sun and for that reason is usually lost in its glare. Twice every 116 days, however, it reaches "elongation" when it is farthest east or farthest west of the sun. In the former case it sets a little while after sunset, and in the latter it rises a short time before sunrise. Every elongation is not equally effective in bringing the planet into view, but when one to the east occurs in the springtime, we generally have the best chance of seeing it.

Such an event occurs in May with Mercury reaching its greatest eastern elongation on May 10. On that date, as seen from most of the United States, it sets approximately an hour and three quarters after the sun. This is about the same as the length of the evening twilight, so by the time the sky is dark the planet is gone from sight. For a period of perhaps a week, around the 10th, one may be able to see it, low in the sky, a little north of the west point of the horizon, as a brilliant star in the gathering dusk.

Venus Becomes Visible

After the middle of May, when Mercury has gone out of sight again, another planet even brighter should begin to be visible in about the same position. This is Venus, the second planet, counting outward from the sun, with which it was in line on April 16. Now it, too, is east of that body, and will continue drawing away from it until Nov. 20 when it will reach its greatest elongation. At the beginning of May, Venus sets only a quarter of an hour after the sun, but by the 31st this is increased to about an hour. Venus is so brilliant, of astronomical magnitude minus 3.4 at this time, that one should then be able to see it low in the west soon after sundown.

Neither Venus nor Mercury are shown on the accompanying maps, because both planets are out of the sky at the times for which they are drawn, namely, 11:00 p.m., your local variety of daylight saving time on May 1, and an hour earlier in the middle of the month. One planet does appear on them, however, and that is Saturn, in the constellation of Leo, the lion, close to the bright star Regulus. Incidentally, Saturn has recently been moving westerly in the sky, approaching Regulus. On May 1 it is stationary for a time and then resumes its direct, or easterly motion after coming almost directly north of Regulus.

The occasional retrograde, or westerly, movement of the outer planets like Saturn is due to the fact that their apparent movement in the sky is made up of a combination of their own motion and that of the earth, from which our observations are made. When, on an express train, you pass a slower freight on the next track, the freight seems to be going backwards, even though it is really going the same way as the express. As the faster moving earth passes Saturn, it likewise seems to go backwards.

Brightest star seen on May evenings is Vega, in Lyra, the lyre, which shines in the northeast. Second is Capella, in Auriga, the charioteer, to the northwest, and third Arcturus in Bootes, the bear-driver, high in the south. Below this constellation is Virgo, the virgin, with bright Spica. Regulus, in Leo, has already been mentioned because of the proximity of Saturn. To the west is Canis Minor, the lesser dog, with Procyon, and to the right of this group are the twins, Gemini, with first magnitude Pollux.

Just appearing above the southeastern horizon is Scorpius, the scorpion, with Antares. This is also of the first magnitude although it is so low that it looks much fainter. Later in the night it rises higher in the south and is much more brilliant. Toward the end of the month the brilliant planet, Jupiter, in the constellation of Capricornus, the sea-goat, also rises about midnight.

The planet Mercury, which appears briefly in May, is not only nearest to the sun; it is also smallest (except the tiny asteroids), swiftest in its motion and it receives the most light and heat from the sun. Its distance from the sun is 36,000,000

miles, on the average, but it varies all the way from 28,600,000 to 43,400,000. It can approach as close to the earth as some 50,000,000 miles (when it is practically in line with the sun and not visible), while it may be as far as 136,000,000 miles when it is on the opposite side of the sun. It takes 88 days for one revolution around the sun. In diameter, it is 3,100 miles and because it is so small, the force of gravity there is much less than on earth. A person who weighs 200 pounds here would only weigh 58 pounds on Mercury.

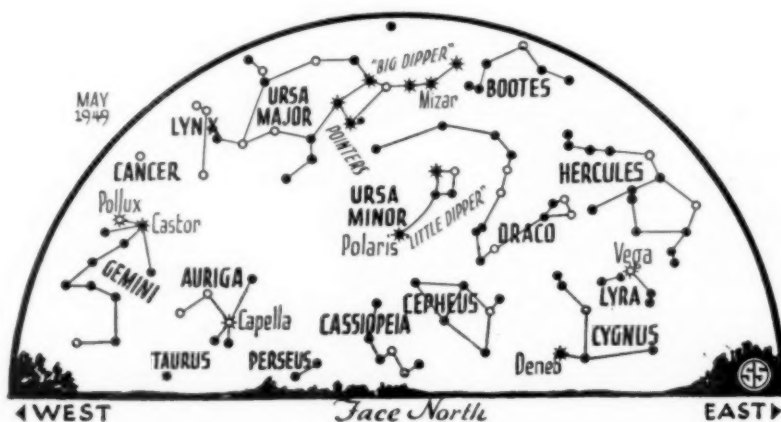
No Detectable Atmosphere

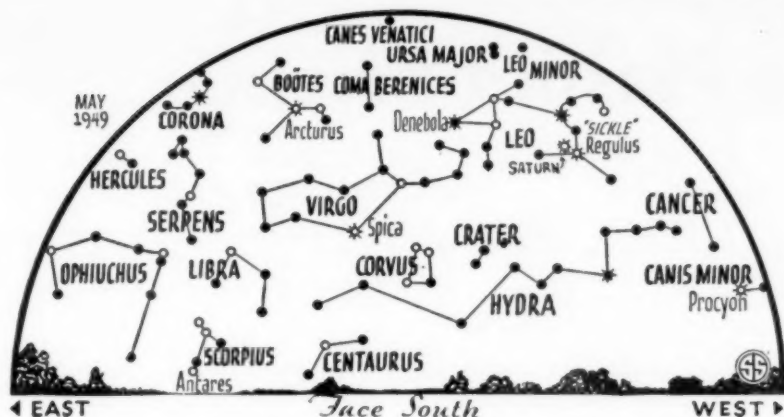
However, it would be a most uncomfortable place to be. First of all, it has no atmosphere that can be detected, and it seems to have a rough surface something like that of the moon. Just as the moon always keeps the same hemisphere towards the earth, so it seems also that Mercury keeps the same face toward the sun. That half, therefore, is very hot, actually about 770 degrees Fahrenheit, which is above the melting point of lead. The dark side is very cold, probably not far above the absolute zero (minus 460 degrees Fahrenheit) at which all heat is absent.

However, there are irregularities in the motion of Mercury, similar to those which occur with the moon, by which there is a little more than half of the surface on which the sun may shine. In between the large area where the sun never sets, and another where it never rises, there is a narrow zone in which the sun sometimes rises a little above the horizon, then drops behind it again. Without the ameliorating presence of an atmosphere, the temperature changes here would be enormous. It seems, therefore, as if Mercury is a most unsuitable place for any kind of life.

Time Table for May

May EDST
I 2:00 p.m. Saturn stationary, resumes eastward motion





◊ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

- | | | | | | |
|----|-------------|--|----|-------------|--|
| 4 | early a. m. | Meteors visible from constellation of Aquarius | 19 | 3:22 p. m. | Moon in last quarter |
| 5 | 5:33 p. m. | Moon in first quarter | 22 | 10:00 a. m. | Moon farthest distance 251,600 miles |
| 6 | 4:20 p. m. | Moon passes Saturn | 27 | 6:24 p. m. | New moon |
| 10 | 11:00 a. m. | Moon nearest, distance 224,900 miles | 28 | 1:48 p. m. | Moon passes Mercury |
| | 4:00 p. m. | Mercury farthest east of sun | | 5:37 p. m. | Moon passes Venus |
| 12 | 8:51 a. m. | Full moon | | | Subtract one hour for CDT, two hours for MDT, and three for PDT. |
| 17 | 10:14 a. m. | Moon passes Jupiter | | | |

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AERONAUTICS

Speed for Air Supremacy

► **PROGRESS** in aerodynamics research during the past year has been more rapid perhaps than in any other year since the Wright Brothers' first powered flight, the annual report, just issued, of the National Advisory Committee for Aeronautics states. Superior speed is essential to supremacy in the air, it declares.

Aerodynamics is concerned with aviation problems of aircraft design to achieve speed, stability and safety in flight. Speed is the most valuable single characteristic of aircraft, particularly military, Dr. Jerome C. Hunsaker, chairman of the committee, states in his letter of submittal to Congress. One immediate objective is to solve, as quickly as possible, the most pressing problems attendant to high-speed flight.

The research of the National Advisory Committee for Aeronautics, a government agency known as NACA for short, is directed toward the over-all objective of acquiring new scientific knowledge essential to assure American leadership in aeronautics. The committee, with its several laboratories and hundreds of aircraft scientists, directs its research to the needs of military, commercial and private aviation to obtain the scientific information to permit flight at increasing speeds to be accomplished in a safer and more economical manner.

As a consequence of the similarity of the basic objectives of both military and civil aviation, to carry greater loads faster, farther, and more economically, scientific research conducted with the objective of im-

proving military aircraft is applicable to civil aviation. In general the research results are first applied to military aircraft and, after further practical experience and development, to civil aircraft.

Much work has been done during the year by NACA in the design and testing of various types of wings for airplanes. The wings of aircraft designed to fly at near the speed of sound are, in general, characterized by thin airfoil sections. Of the wing plan forms suitable for flight at moderate supersonic speed, triangular wings, such as used on the new so-called Delta-wing plane, combine the structural efficiency with the dynamic efficiency of a highly sweptback leading edge.

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PHYSICS

Attain Absolute Stillness In New Echo-Proof Chamber

► **ABSOLUTE** stillness, a condition few have ever encountered, is achieved in a new silent chamber revealed at the U. S. Army Signal Corps base in Fort Monmouth, N. J. This no-echo chamber was designed and constructed for the testing of delicate instruments.

Absolute quietness is a condition that few persons can expose themselves to for 30 minutes without pronounced discomfort, the engineers who built the chamber discovered. Therefore, provisions were made so that the instruments inside can be read

from the outside. The engineers also learned that the presence of anyone inside the structure impaired the complete efficiency of tests.

The chamber is to be used primarily to determine operational accuracies of microphones, head-sets, loud-speakers and other items requiring minute examination. It is known scientifically as an anechoic chamber. The term means "no-echo". An ordinary sound-proof room was not enough because any variation, such as the reflection of sound from walls, introduced a false reading on the indicators. Glass fiber plays an important part in the construction because it is one of the best sound-absorbent materials available.

The value of an accurate means of knowing how much noise is made by all kinds of machinery used by the Army, and effective methods of eliminating the noise, can not be underestimated. The noise made by a hand generator operating a piece of equipment in the field, for instance, would reveal the presence of the operator to the enemy, even if he could not be seen. He would be quickly eliminated and that piece of apparatus put out of action. The Signal Corps objective is to produce apparatus which gives off so little noise that they defy detection.

Science News Letter, April 23, 1949

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by Roland H. Berg

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ELECTRONICS

New Conducting Plastics

► **ELECTRICITY** can be made to flow through any kind of plastic material in large or small amounts as desired, by a new development of the Naval Ordnance Laboratory at White Oak, Md., working with a New York scientist.

Plastics are ordinarily good insulators. They can now be made electrical conductors without affecting their strength and other desired properties, and will find greater service and use in military and industrial applications.

While details are being kept secret because of patents and military uses, both chemical composition and processing are involved in making the plastics electrically conducting.

The conducting plastics are being called Markites, and Dr. Myron Coler, professor

at New York University and representative of the Markite Company, New York, invented and developed the process.

Electrically conducting plastics can be electroplated, an advantage wherever light weight is of importance.

Another application will be in making rheostats for changing resistance as desired. Rheostats must now be wound individually. Using the new process, it may be possible to mold them, saving time and money.

Markites can be produced which have a conductivity ranging from that of an insulator to that of copper, one of the best conductors under ordinary conditions.

Until the development of these new plastics there have been few materials with a conductivity in the intermediate range.

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INVENTION

"Incendiary Tack" for War

► A **SUPER-HOTFOOT** treatment for the tires of enemy trucks, airplanes or what-have-you, invented during the recent war and available for the next one—if there has to be a next—has been disclosed via the U. S. Patent Office. Modestly titled an "incendiary tack" by its inventor, Herman J. Janney of the brightly named town of Opportunity, Wash., it will be recognized by any motorist who has ever pulled bits of wire or glass splinters out of his thinning treads as something more intimately fiendish even than germ warfare.

The general idea is to hide a sharp-pointed tack inside a thin shell of metal or plastic, and to surround it with a charge of something that will set fire to any tire that crunches down on it. In its simplest form, this would consist of a charge of thermit mixed with pitch or other sticky, inflammable stuff. This would not only burn a hole in the tire; it would scatter flaming bits backwards, forwards and upwards as the wheel whirled.

An even more devilishly ingenious variant suggested by the inventor would be to make the tack hollow, resting on a small container of gasoline. When struck, this would act like a hypodermic syringe, injecting the gasoline into the tire, to become an explosive mixture. Then, a few turns of the wheel later, a thin disk underneath would be worn through, exposing a concealed match-head charge to the scratching action of the road. The resulting blow-out had better be imagined than experienced.

These gentle contributions to the art of civilized warfare are intended to be planted by hand, or strewn from the rear of the last retreating jeep, or sprinkled from low-flying planes.

Mr. Janney was in the Army when he got this hot idea, so rights in his patent, No. 2,466,707, are assigned to the government. Naturally, he was a buck private when he thought of it; nothing so ingeniously "ornery" would occur to the High Brass.

Science News Letter, April 23, 1949

PHYSIOLOGY

Blood's "Police" Cells Surround Tantalum Metal

► **TANTALUM**, the non-irritating metal now much used for skull plates, permanent bone braces and other surgical purposes, is nevertheless treated as an alien substance by those vigilant policemen of the blood, the white corpuscles.

What happens when tantalum comes into intimate contact with living body tissue is graphically shown in a new motion picture film made by Dr. Carl C. Speidel, University of Virginia anatomist. Funds

for the motion picture were granted by the American Cancer Society. The film received its first public showing April 13, at the meeting of the American Association of Anatomists in Philadelphia.

In making the film, Dr. Speidel used a technique which he has developed over a period of more than 15 years. An anesthetized tadpole is placed on the stage of a high-power microscope, and events in living tissue are studied and photographed in slow motion through its practically transparent tail.

Tantalum, in the form of sheets, fine wire and powder, was introduced into various tissues of the tadpole tail. Always its reception was the same. The white corpuscles hurried to the scene, and like human policemen forming a cordon in front of a crowd, they blocked off the metal from the rest of the tissues with a solid wall formed of their own bodies. Small isolated particles of tantalum powder are picked up and carried off through the circulation, but larger masses of the powder are walled off as if they were solid.

Science News Letter, April 23, 1949

Words in Science— MINIATURIZATION

► **MINIATURIZATION** is a big word which means, of course, making things smaller. Today, it is an important term in electronics, and particularly military research in electronics.

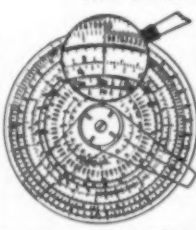
The idea is simply that space is precious on a military vehicle such as a ship or plane. Radio, radar and other equipment can take up a lot of space. By making them smaller much precious space is saved.

The Navy recently demonstrated how by redesigning, using new techniques and materials and dwarf parts, a radio set was built to take up only about one-fourth as much space as the same equipment had previously.

Miniaturization is now the watchword in military electronics design.

Science News Letter, April 23, 1949

THE BINARY SLIDE RULE



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ENTOMOLOGY

Bee Is Guided by Sun

Finder-bees do a dance indicating to others where the nectar is to be found but a clear sky is necessary for correct orientation on the part of the bee.

► A BEE'S ability to tell her fellow workers the direction to a new supply of nectar she has discovered seems to depend on her having a clear glimpse of the sun, or at least of the sky. This is one of the things discovered by the noted Austrian entomologist, Prof. Karl von Frisch of the University of Graz, who spoke before an audience of scientists in Washington.

When a scout bee has discovered a new source of supplies, she passes the good word on to her sisters by doing an excited dance in which, to quote an old light-opera favorite, "every little movement has a meaning of its own." Distance is indicated by the dance pattern; direction by the way the bee's body is pointed most of the time.

Normally, the "honey dance" is performed on the vertical face of the honeycomb; the pull of gravity on the bee's body apparently assists in maintaining her sense of direction. However, Prof. von Frisch found by laying an observation hive flat on its side, the finder will still point the direction successfully if sunlight or sky-light falls on her.

In total darkness the finder-bee will dance, but she becomes utterly confused about direction, pointing her body "every which way". It was possible to observe

bees in what was to them total darkness by using a red light within a light-tight shelter, since it was proven long ago that bees cannot perceive red light.

When Prof. von Frisch held a strong pocket flashlight in the approximate position of the sun, the hitherto dark-bewildered bee immediately oriented her dance-position in the direction of the nectar find. When he held his "ersatz" sun in a false position, the bee gave a correspondingly false pointing.

There is fairly strong indication that to be effective for bee-guiding purposes the light must be polarized, that is, have all its wave-fronts moving in the same plane. This was indicated when the finder-bee gave accurate performance as long as she could see a small round patch of blue sky. When a white cloud drifted across the opening she became confused, but again oriented her dance correctly when blue sky again became visible. Light reflected from the sky is polarized, but light reflected from clouds is not.

Prof. von Frisch's lecture was sponsored jointly by the Washington Academy of Sciences, the Biological Society of Washington and the Entomological Society of Washington.

Science News Letter, April 23, 1949

CONSERVATION

Fuel Economy Needed

► OIL and natural gas must be used more economically than they are at present if the nation is to remain industrially healthy and defensively strong, warns Secretary of the Interior J. A. Krug in his annual report. Declining to share the alarm with which some observers look upon America's fuel situation, he nevertheless feels that some readjustments in power development would be in the nation's best interests.

We have used up most of the easily accessible oil, he states, and are going farther afield and drilling deeper for fresh supplies—necessarily at greater expense. We could produce immense quantities of oil synthetically from solid fuels and by shale extraction, but "it probably would be cheaper in the long run to use some foreign (or imported) oil than to develop some of our own more expensive sources and substitutes."

However, in the uneasy state of the world's peace, it is risky to depend on oil supplies far from our own shores, the Secretary points out. If sudden war should

cut us off from overseas sources on which we had become too dependent, "we would find ourselves in a much tighter spot on oil than in the last war."

The answer, he feels, is to be found at least partly in a more careful use of oil, permitting our almost vanished reserve capacity to be restored. This should be backed up with development of synthetics and other substitutes as rapidly as possible; though he estimates it will take at least 10 years to develop them far enough to keep our transportation systems running in a continuing emergency, not to mention keeping many factories running.

Secretary Krug is especially critical of the waste of natural gas into the air, and its diversion, via pipelines, to compete with coal in Eastern industrial areas. He states:

"Industry estimates of proved natural gas reserves place them at somewhere between 166 and 200 trillion cubic feet, or only enough to last 40 years at present rates of consumption. Already our Eastern resources are almost exhausted. Can we af-

ford to use such a limited resource to compete with coal?"

Science News Letter, April 23, 1949

Science Service Radio

► LISTEN in to a discussion on "Exploring Cosmic Rays" on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EST, Saturday, April 30. Dr. Victor Neher of the California Institute of Technology, Pasadena, Calif., and Dr. Urner Liddel of the Office of Naval Research, Washington, D. C., will be guests of Watson Davis, director of Science Service. Dr. Neher has been observing cosmic rays on B-29 flights at heights of six miles above the earth because cosmic rays bombard the earth from outer space constantly smashing the hearts of atoms. The new results to be reported promise to be of fundamental importance.

Science News Letter, April 23, 1949

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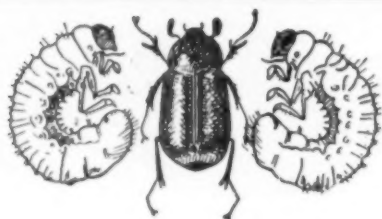
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ENTOMOLOGY

NATURE RAMBLINGS

by Frank Thone



Underground Enemies

➤ **EARLY** gardening operations are apt to turn up numbers of the fat white larvae commonly known as grub-worms, and once in a while a big brown beetle, its shell still moist and soft. It is natural to find them together, for the grub-worms are the larvae, or infants, of the beetles.

In ancient Egypt, these beetles would have been treated with the utmost respect, for they belong to the same general entomological cousinship as the scarab, which was a sun symbol.

Most widely distributed are the ones known sometimes as May-beetles, sometimes as June-bugs, depending on the month in which they become most numerous above ground in your neighborhood. These are found all over the country, except in the more arid regions.

In a large and regrettably growing section of the Northeast the pattern is repeated on a smaller scale—about one-fourth the May-beetle size—by a more recently introduced pest, the Japanese beetle. The two insects are fairly closely related, though their native homes are far apart.

Whenever your spade turns up either grub-worms or beetles, be sure to destroy

them. If you keep chickens, they will welcome such tidbits eagerly. The grub-worms also make good fish bait—if your mind tends to stray from the sober business of gardening. But even if you can't put them to any practical use, kill them anyway. Crush them with your spade, or drop them into a tin of kerosene.

If you live in Jap-beetle country, you don't need to be told why you should massacre all such insects you turn up. You have seen what havoc the swarms of adults can work on anything green and edible. The larvae underground duplicate on the

roots of plants what the adults do to the tops.

The bigger white grubs are even more destructive underground feeders than the Japanese beetle larvae, for their appetites are correspondingly larger and they are just as omnivorous. They will gnaw into the hearts of potatoes or carrots or other root crops; and what a lot of grub-worms can do to a strawberry bed can't be adequately discussed in print. These underground enemies show no mercy to your garden, and you should give them no quarter.

Science News Letter, April 23, 1949

ACOUSTICS

Deafness from Loud Noise

➤ **THE** temporary and partial deafness that you experience after listening to a very loud noise is not due to fatigue of the ear or the hearing nerve, because it takes place too quickly.

This is shown by new experiments conducted by Drs. E. Luscher and J. Zwislöcki, at the Electro-Acoustic Laboratory, of the University Clinic for Oto-Rhino-Laryngology, in Basle, Switzerland, and reported in the JOURNAL OF THE ACOUSTICAL SOCIETY OF AMERICA (March).

By varying the time interval between the test tone and the one used to deafen the listener it was established that the loss of sensitivity of the ear reaches its maximum in less than 0.4 second after the exposure to the loud noise. This establishes the fact that the process is one of dulling of the hearing by adaptation, the investigators conclude.

That the adaptation occurs in the ear and not in the hearing centers of the brain was shown when the deafening noise was led into one ear and the test tone into the other. It was only when the deafening

noise heard by one ear was louder than 50 decibels, that the other ear was deafened. It has previously been established that sounds louder than 50 decibels are conducted through the head from one ear to the other, and therefore the ear tested heard the deafening sound by bone conduction.

The loss of sensitivity is approximately proportional to the loudness of the deafening noise. After exposure to a sound 80 decibels above the faintest audible sound, it takes a sound 40 to 50 decibels louder than the faintest one normally heard to be audible.

The dulling of the hearing affects not only sounds of the same pitch as the deafening noise; the adaptation spreads to neighboring frequencies, chiefly higher ones.

Not only does the hearing loss occur very quickly, but the return to normal takes place within a few tenths of a second. After you are exposed to a noise 80 decibels louder than the faintest you can hear, your ears' sensitivity will be back to normal in 250 millionths of a second.

Science News Letter, April 23, 1949

• Books of the Week •

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W. Washington 6, D. C. Ask for free publications direct from issuing organizations.

ATOMIC ENERGY AND CONVENTIONAL ARMAMENTS—Gov't Printing Office, 57 p., paper, 20 cents. Discussions in the United Nations General Assembly in Paris, September 21–December 12, 1948, of the issues of atomic energy and disarmament.

THE CHARLES LATHROP PACK DEMONSTRATION FOREST—Clifford H. Foster and Burt P. Kirkland—Charles Lathrop Pack Forestry Foundation, 36 p., illus., paper, free upon request to publisher, 1214 Sixteenth Street, N. W., Washington 6, D. C. Results of twenty years of intensive forestry management.

CHILDREN FOR THE CHILDLESS—Consumers Union, 34 p., paper, 50 cents. A report on infertility and what can be done about it.

CORAL SEA—Alan Villiers—Whittlesey, 310 p.,

illus., \$4.00. An exciting story of adventure and exploration in one of the least known and most dangerous areas of the world.

DIAGNOSIS OF VIRAL AND RICKETTSIAL INFECTIONS—Frank L. Horsfall, Jr., Ed.—Columbia University Press, 153 p., \$3.75. The first of a series to come from Symposia held by the New York Academy of Medicine Section on Microbiology.

ELECTRONIC TIME MEASUREMENTS, Vol. 19, MIT Radiation Series—Britton Chance and others, Eds—McGraw-Hill, 538 p., illus., \$7.00. Presents a method of approach to the problems of time and distance measurement by manual and automatic means.

ENCYCLOPEDIA OF WORLD TIMBERS—F. H. Timmuss—Philosophical Library, 156 p., \$4.75.

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FOUNDATIONS OF NUCLEAR PHYSICS—Dover, 272 p., illus., \$2.95. Essential primary source on "classic" materials in this field, reproduced in most instances from the originals in facsimile.

FRESHMAN MATHEMATICS—C. V. Newsom—*Rinehart*, 3rd ed., 559 p., illus., \$5.00. Algebra, trigonometry, and analytical geometry presented as a tandem course.

A GUIDE TO HUMECTANT SELECTION—S. M. Livengood—*Maclean-Hunter*, 2 p., paper, free upon request to Mellon Institute of Industrial Research, Pittsburgh 13, Pa. Contains a chart to aid in picking materials for their water absorbing or repelling qualities.

THE HATCHABILITY OF CHICKEN EGGS AS INFLUENCED BY ENVIRONMENT AND HEREDITY—Walter Landauer—*University of Connecticut Press*, 231 p., illus., paper, free upon request to publisher, College of Agriculture, Storrs, Conn. The results of investigation of the genetic factors influencing hatchability.

HUMAN RIGHTS AND GENOCIDE—*Gov't Printing Office*, 52 p., paper, 15 cents. Contains the text of the UN Universal Declaration of Human Rights and the stand taken by U. S. delegates on the question.

INTERNATIONAL ECONOMIC PROBLEMS—*Gov't Printing Office*, 35 p., paper, 10 cents. Includes text of the resolution on economic development of under-developed countries as well as statements of U. S. delegates to the UN General Assembly.

INTROGRESSIVE HYBRIDIZATION—Edgar Anderson—*Wiley*, 109 p., illus., \$3.00. A report on methods for studying hybridization in the field. A special feature is the section which shows how to draw up a detailed taxonomical description of a species without ever having seen it.

ISOTOPES AND THEIR APPLICATION IN THE FIELD OF INDUSTRIAL MATERIALS—Paul C. Aebersold—*American Society for Testing Materials*, 28 p., illus., paper, \$1.00. A discussion of the significance and interrelation of atomic energy and industrial materials.

LABOR IN AMERICA—Foster Rhea Dulles—*Crowell*, 402 p., \$4.50. A one-volume history of American labor written for the layman.

LOBUND REPORTS, No. 2—James A. Reyniers, Ed.—*University of Notre Dame*, 162 p., illus., paper \$1.75, cloth \$2.50. Two articles give details on the rearing of germ-free chickens; a third raises the difficult ques-

tion of a special nomenclature for germ-free animals.

MAMMALS OF LAKE TAHOE—Robert T. Orr—*California Academy of Sciences*, 127 p., illus., \$4.00. History of the plants and animals that inhabit the Sierra Nevada.

MELLON INSTITUTE—E. R. Weidlein, Jr.—*Butterworths Scientific Publications*, 4 p., paper, free upon request to the Mellon Institute, Pittsburgh 13, Pa. A short history of the institution.

MICROBIOLOGY AND MAN—Jorgen Birkeland—*Williams and Wilkins*, 2nd ed., 525 p., illus., \$5.00. Published jointly with *Appleton-Century-Croft*. (See listing SNL Mar. 26)

MUST WE HIDE?—R. E. Lapp—*Addison-Wesley*, 182 p., illus., \$3.00. Written for laymen by a scientist who worked on the atomic bomb and participated in the tests at Bikini. The author believes we must not hide from the facts; that an informed America will be unconquerable.

THE NATIVE FORESTS OF CUYAHOGA COUNTY, OHIO—Arthur B. Williams—*Cleveland Museum of Natural History*, 90 p., illus., paper, \$1.00. A study of the character and composition of the forest cover before the white man entered it.

NEW WORLDS EMERGING—Earl Parker Hanson—*Duell*, 385 p., \$3.50. Based upon 25 years of exploration from the Arctic to the tropics, this book discusses the possibilities in development of neglected lands and backward peoples.

NOTATION ON A COLOR SYSTEM—Louis Cheskin—*Color Research Institute of America*, 18 p., illus., paper, 50 cents. A report on how to use color for planning, identification, mixing-matching, and printing.

PERSPECTIVE IN MEDICINE: March of Medicine, 1948—*Columbia University Press*, 163 p., \$2.50. Six lectures on the frontiers of medical research for the general reader, the student, and the professional medical man.

PHOTOGRAPHY FOR FUN AND PROFIT—*Arco*, 313 p., illus., \$2.50. A reference to basic photographic principles and to the technique of photography.

PHYSICS PRINCIPLES AND APPLICATIONS—Henry Margenau, Willim W. Watson, and C. G. Montgomery—*McGraw-Hill*, 760 p., illus., \$5.00. A thorough and accurate introduction to the subject. For the college sophomore.

PLEASURE WITH PLANTS—L. R. Tehon—*Illinois Natural History Survey*, 32 p., illus., paper, free upon request to publisher, Urbana, Ill. A discussion of what is necessary and desirable for a prospective amateur botanizer to know.

PROBLEMS OF GREECE, KOREA, AND PALESTINE—*Gov't Printing Office*, 65 p., paper, 15 cents. Background for an understanding of some difficult world problems, as presented by U. S. delegates to the UN at Paris.

RADIOACTIVE MEASUREMENTS WITH NUCLEAR EMULSIONS—Herman Yagoda—*Wiley*, 356 p., illus., \$5.00. A coordinated study on the use of photographic emulsions in measuring radioactivity.

SCIENCE IN PROGRESS, Sixth Series—George A. Baitsell, Ed.—*Yale University Press*, 322 p., illus., \$5.00. A group of papers based on Sigma Xi and Silliman Lectures and written by men who have been responsible for the advances in various scientific fields.

SUGAR AND SUGAR BY-PRODUCTS IN THE PLASTICS INDUSTRY—Louis Long, Jr.—*Sugar Research Foundation*, rev. ed., 66 p., paper, free upon request to publisher, New York. A survey of the patent and periodical literature. Sucrose, glucose and fructose are potential raw materials of either phenolic or alkyd plastics and acids from sugar are used as plasticizers.

THE TENETEHARA INDIANS OF BRAZIL—Charles Wagley and Eduardo Galvao—*Columbia University Press*, 200 p., illus., \$3.75. The study of a surviving group which has made a successful adjustment to the new environment yet kept its original culture pattern.

THE UTILIZATION OF SUCROSE BY THE MAMMALIAN ORGANISM—Walter W. Wainio—*Sugar Research Foundation*, 45 p., illus., paper, free upon request to publisher, New York. What happens to the 85 pounds of sugar you eat each year.

VITAMINS AND HORMONES, Vol. VI—Robert S. Harris and Kenneth V. Thimann, Eds.—*Academic Press*, 435 p., illus., \$7.80. The latest report in this important series. Includes a cumulative subject index of Volumes I through V.

VOTING AND MEMBERSHIP IN THE UNITED NATIONS—*Gov't Printing Office*, 34 p., paper, 15 cents. Discussion of admission of new members, a proposal vetoed by Russia, and of voting in the Security Council.

THE WAYS OF A MUD DAUBER—George D. Shafer—*Stanford University Press*, 78 p., illus., \$2.50. The study on the life-habits of the mud dauber wasp. Remarkable photographs.

YOUR LAND—Fred C. Morris—*Virginia Polytechnic Institute*, 95 p., illus., paper, 75 cents. A study of surveys, maps, and titles.

Science News Letter, April 23, 1949

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✿ **CHAIR PADS**, easily installed on slip-seat chairs, are made of a heavy-gauge vinyl plastic combined with a thin plastic under layer with cellulose cotton filling. They are stitchless pads, but the parts are firmly held together by an electronic bonding process.

Science News Letter, April 23, 1949

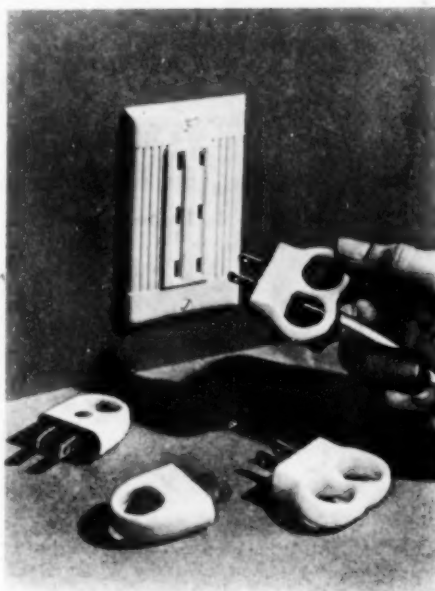
✿ **HIGH-FREQUENCY WELDER**, that creates no interference with the reception of neighborhood radios and television sets, uses a new tube-type oscillator and modified torch which prevents the nuisance by staying on its assigned frequency. Welding with an arc shield by helium gas is now widely practiced.

Science News Letter, April 23, 1949

✿ **INDOOR TELEVISION antenna**, particularly for use in urban apartments, is what is called an end-load dipole type, with two horizontal metal rods, extending in opposite directions from a movable base, which have aluminum disks at their extremities. It is hand-turned to get the best reception position.

Science News Letter, April 23, 1949

✿ **ELECTRIC PLUGS**, equipped with finger grips as shown in the picture, solve



the problem of the housewife in disconnecting her electrical equipment. The plugs are molded of a white plastic that is attractive, durable and an excellent electrical insulating material.

Science News Letter, April 23, 1949

✿ **DIRECTIONAL-LIGHT switch**, which tells a motor vehicle driver if his lights are working, is attached to the steering column and employs a jewel light in its top to signal failure of bulbs in the system. If the jewel light fails when a switch is thrown to the left, it shows that the directional light on the left of the vehicle is out.

Science News Letter, April 23, 1949

✿ **LIGHTWEIGHT INSULATION** for use in building walls comes in rolls to fit between the upright studs of the wall and weighs only one-third as much as ordinary mineral fiber insulating materials. Made of extremely fine glass fiber, it is fire-resistant, rot-proof, vermin-proof and pack-resistant.

Science News Letter, April 23, 1949

✿ **MUCILAGE APPLIER**, for the office desk, is a decorative two-piece affair consisting of a small flask to hold the adhesive and a plastic base, the top of which is shaped to hold the flask in an inverted position. A sponge on the mouth of the flask is always mucilage-moist, soft and ready to use.

Science News Letter, April 23, 1949

Do You Know?

Armed vehicles and airplanes are being used in Finland to battle wolves.

Of America's total utility energy from hydro-electric plants, 18% is from government installations.

Seed corn can be kept for many years without much loss of vitality if dried to 8% or less moisture and stored in airtight containers at a uniform low temperature.

Hybrid corn is already giving farmers greatly increased yields; hybrid sorghum, now under development, is expected to give a 40% increase in grain.

Louisville, Colo., has a "male tax" of \$3 per year payable in cash or labor, levied against all men from 21 to 60 years of age except war veterans and firemen.

The railroad track extending over six miles through the Moffat tunnel in Colorado is made of continuous, jointless, welded, 131-pound rail, and is said to be the only installation of its kind in the country.

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